

Computer Engineering, BS

Program Description

The Bachelor of Science Degree in Computer Engineering teaches students the necessary skills to design, analyze, and build electromechanical systems. Computer engineering is a field that includes elements of computer science, electrical engineering, software development, and mechanical engineering. Computer engineering emphasizes hardware integration with software or electrical systems. Although similar to electrical engineering, computer engineering provides more teaching in the areas of programming, sensors, and actuators. A student with a degree from this program will be well prepared to pursue an advanced degree in engineering or computer science, or to pursue a technical career in industrial and technological environments.

Professional Licensure/Certification (PLC) Requirements

The curriculum for programs at Dixie State University customarily leading to licensure have been designed to meet the educational licensure/certification requirements in Utah as well as to prepare students to apply for licensure exams in the State of Utah. The licensure boards in each state are responsible for establishing the requirements for licensure/certification for their state. Requirement may vary state to state and may change at any time. Students who intend to use their DSU degree to secure licensure in any state other than Utah will need to review the professional licensure disclosures in that state pertaining to their program and consult with the state professional licensing board. For more information, visit the State Authorization and Professional Licensure (<https://academics.dixie.edu/state-authorization/>) web page and select your program, or speak to the director of your program.

Admission Requirements

The admissions process works as follows:

1. Student applies and is accepted to DSU
2. Student designates their major as Pre-Engineering (pursuing Associate of Pre-Engineering)
3. Student passes the following courses with a C- or better:
 - CS 1400
 - CS 1410
 - MATH 1210
 - MATH 1220
 - PHYS 2210
 - PHYS 2215
1. Student meets with the engineering advisor to ensure that required courses are complete and to make an academic plan
2. Student's major is switched from Pre-Engineering to Computer Engineering

Program Curriculum

125.5 credits

DSU General Education Requirements

All DSU General Education requirements must be fulfilled. A previously earned degree may fulfill those requirements, but courses must be equivalent to DSU's minimum General Education standards in American Institutions, English, and Mathematics.

Code	Title	Hours
	General Education Core Requirements (catalog.dixie.edu/programs/generaleducation/#gerequirementstext)	
	English	3-7
	Mathematics	3-5
	American Institutions	3-6
	Life Sciences	3-10
	Physical Sciences	3-5
	Laboratory Science	0-1
	Fine Arts	3

Literature/Humanities	3
Social & Behavioral Sciences	3
Exploration	3-5

* Exploration GE must be fulfilled with either a BIOL or CHEM GE course to meet ABET accreditation requirement for 30 credits of math and science.

Computer Engineering Required Courses

Code	Title	Hours
ENGL 3010	Professional Writing and Business Ethics (Prerequisites: ENGL 1010 and ENGL 2010, or equivalent placement score)	3
MATH 1210	Calculus I (MA) (Prerequisites: MATH 1010 and MATH 1050 and MATH 1060 or MATH 1080, or equivalent placement score)	4
MATH 1220	Calculus II (MA)	4
MATH 2250	Differential Equations and Linear Algebra	4
MATH 3400	Probability & Statistics	3
PHYS 2210 & PHYS 2215	Physics/Scientists Engineers I (PS) and Physics/Scientists Engineers I Lab (LAB)	5
PHYS 2220 & PHYS 2225	Physics/Scientists EngineersII and Physics/Scientists Engineers II Lab	5
CS 1400	Fundamentals of Programming	3
CS 1410	Object Oriented Programming	3
CS 2420	Introduction to Algorithms and Data Structures	3
CS 2450	Software Engineering	3
CS 2810	Computer Organization and Architecture	3
CS 3005	Programming in C++	3
CS 3310	Discrete Mathematics	3
CS 3410	Distributed Systems	3
CS 3400	Operating Systems	3
MECH 2210 & MECH 2215	Circuits and Circuits Lab	4
MECH 2250 & MECH 2255	Sensors & Actuators and Sensors & Actuators Lab	4
MECH 3200 & MECH 3205	Systems & Controls and Systems & Controls Lab	3.5
ECE 1200	MATLAB and Arduino	1
ECE 2700 & ECE 2705	Digital Circuits and Digital Circuits Lab	4
ECE 2280 & ECE 2285	Microelectronics and Microelectronics Lab	4
ECE 3730 & ECE 3735	Embedded Systems I and Embedded Systems I Lab	4
ECE 3500	Signals and Systems	3
ECE 4730 & ECE 4735	Embedded Systems II and Embedded Systems II Lab	4
ECE 4500	Digital Signal Processing	3
ECE 4005	CE Product Design I	3
ECE 4015	CE Product Design II	3

Computer Engineering Technical Elective Courses

Code	Title	Hours
Complete 9 credits from the following:		
Any ECE 4xxx, excluding ECE 4000, 4005, 4010, 4015, 4500		
Any MECH 4xxx, excluding MECH 4000, 4010		

Any MATH 4xxx, excluding MATH 4500, 4890, 4900	
Any CHEM 4xxxx, excluding CHEM 4000R, 4910	
ANY CS 4xxx, excluding CS 4600, 4920R, 4990, 4991R, 4992	
MATH 3150	Introduction to Partial Differential Equations
MATH 3450	Statistical Inference
CS 3510	Advanced Algorithms/Data Structures
CS 3010	Mobile Application Development for Android
CS 3020	Mobile Application Development: iOS

Graduation Requirements

1. Complete a minimum of 125.5 college-level credits (1000 and above).
2. Complete at least 40 upper-division credits (3000 and above).
3. Complete at least 30 upper-division credits at DSU for institutional residency.
4. Cumulative GPA 2.0 or higher.
5. Grade C- or higher in all Computer Engineering Required Courses and Technical Elective Courses.
6. Pass the Fundamentals of Engineering (FE) Exam

Graduation Plan - 4 years

1st Year

Fall Semester

		Hours
MATH 1210	Calculus I (MA)	4
CS 1400	Fundamentals of Programming	3
ENGL 2010	Intern Writing Selected Topics: (EN)	3
GE Life Sciences		3
GE Exploration (CHEM or BIOL course)		3
Hours		16

Spring Semester

MATH 1220	Calculus II (MA)	4
CS 1410	Object Oriented Programming	3
PHYS 2210 & PHYS 2215	Physics/Scientists Engineers I (PS) and Physics/Scientists Engineers I Lab (LAB)	5
GE Literature/Humanities		3
Hours		15

2nd Year

Fall Semester

CS 2420	Introduction to Algorithms and Data Structures	3
MECH 2210 & MECH 2215	Circuits and Circuits Lab	4
PHYS 2220 & PHYS 2225	Physics/Scientists EngineersII and Physics/Scientists Engineers II Lab	5
ECE 2700 & ECE 2705	Digital Circuits and Digital Circuits Lab	4
ECE 1200	MATLAB and Arduino	1
Hours		17

Spring Semester

CS 2450	Software Engineering	3
MECH 2250 & MECH 2255	Sensors & Actuators and Sensors & Actuators Lab	4
MATH 2250	Differential Equations and Linear Algebra	4
ECE 2280 & ECE 2285	Microelectronics and Microelectronics Lab	4
Hours		15

3rd Year**Fall Semester**

MECH 3200 & MECH 3205	Systems & Controls and Systems & Controls Lab	3.5
ECE 3730 & ECE 3735	Embedded Systems I and Embedded Systems I Lab	4
CS 2810	Computer Organization and Architecture	3
CS 3005	Programming in C++	3
MATH 3400	Probability & Statistics	3

Hours	16.5
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Spring Semester

CS 3410	Distributed Systems	3
ECE 3500	Signals and Systems	3
ENGL 3010	Professional Writing and Business Ethics	3
ECE 4730 & ECE 4735	Embedded Systems II and Embedded Systems II Lab	4
Tech Elective 1		3

Hours	16
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4th Year**Fall Semester**

ECE 4005	CE Product Design I	3
Tech Elective 2		3
CS 3400	Operating Systems	3
CS 3310	Discrete Mathematics	3
GE Fine Arts		3

Hours	15
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Spring Semester

ECE 4015	CE Product Design II	3
ECE 4500	Digital Signal Processing	3
Tech Elective 3		3
GE - American Institutions		3
GE - Social and Behavioral Sciences		3

Hours	15
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Total Hours	125.5
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Graduation Plan - 5 years (MATH 1010)**1st Year****Fall Semester**

MATH 1010	Intermediate Algebra	4
ENGL 1010	Introduction to Writing (EN)	3
General Education (Life Science) (catalog.dixie.edu/programs/generaleducation/#gerequirementstext)		3
General Education (American Institutions) (catalog.dixie.edu/programs/generaleducation/#gerequirementstext)		3

Hours	13
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Spring Semester

MATH 1080	Pre-Calculus with Trigonometry (MA)	5
ENGL 2010	Intern Writing Selected Topics: (EN)	3
CS 1400	Fundamentals of Programming	3
General Education (Fine Arts) (catalog.dixie.edu/programs/generaleducation/#gerequirementstext)		3

Hours	14
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2nd Year**Fall Semester**

ECE 2700 & ECE 2705	Digital Circuits and Digital Circuits Lab	4
CS 1410	Object Oriented Programming	3
ECE 1200	MATLAB and Arduino	1
MATH 1210	Calculus I (MA)	4
General Education (Exploration) (catalog.dixie.edu/programs/generaleducation/#gerequirementstext)		3

Hours **15**

Spring Semester

CS 2420	Introduction to Algorithms and Data Structures	3
PHYS 2210 & PHYS 2215	Physics/Scientists Engineers I (PS) and Physics/Scientists Engineers I Lab (LAB)	5
MATH 1220	Calculus II (MA)	4

Hours **12**

3rd Year**Fall Semester**

MECH 2210 & MECH 2215	Circuits and Circuits Lab	4
CS 3005	Programming in C++	3
PHYS 2220 & PHYS 2225	Physics/Scientists EngineersII and Physics/Scientists Engineers II Lab	5

Hours **12**

Spring Semester

MECH 2250 & MECH 2255	Sensors & Actuators and Sensors & Actuators Lab	4
ECE 2280 & ECE 2285	Microelectronics and Microelectronics Lab	4
CS 2450	Software Engineering	3
MATH 2250	Differential Equations and Linear Algebra	4

Hours **15**

4th Year**Fall Semester**

ECE 3730 & ECE 3735	Embedded Systems I and Embedded Systems I Lab	4
MECH 3200 & MECH 3205	Systems & Controls and Systems & Controls Lab	3.5
CS 2810	Computer Organization and Architecture	3
MATH 3400	Probability & Statistics	3

Hours **13.5**

Spring Semester

ECE 4730 & ECE 4735	Embedded Systems II and Embedded Systems II Lab	4
ECE 3500	Signals and Systems	3
CS 3410	Distributed Systems	3
Tech Elective 1		3

Hours **13**

5th Year**Fall Semester**

ECE 4005	CE Product Design I	3
CS 3400	Operating Systems	3
Tech Elective 2		3
ENGL 3010	Professional Writing and Business Ethics	3

CS 3310	Discrete Mathematics	3
Hours		15
Spring Semester		
ECE 4015	CE Product Design II	3
ECE 4500	Digital Signal Processing	3
Tech Elective 3		3
General Education (Lit / Humanities) (catalog.dixie.edu/programs/generaleducation/#gerequirementstext)		3
General Education (Social & Behavioral Sciences) (catalog.dixie.edu/programs/generaleducation/#gerequirementstext)		3
Hours		15
Total Hours		137.5

Graduation Plan - 5 years (MATH 1050)

1st Year

Fall Semester		Hours
MATH 1050	College Algebra / Pre-Calculus (MA)	4
ENGL 1010	Introduction to Writing (EN)	3
CS 1400	Fundamentals of Programming	3
General Education (American Institutions) (catalog.dixie.edu/programs/generaleducation/#gerequirementstext)		3
Hours		13

Spring Semester

MATH 1060	Trigonometry (MA)	3
CS 1410	Object Oriented Programming	3
ENGL 2010	Intern Writing Selected Topics: (EN)	3
General Education (Exploration) (catalog.dixie.edu/programs/generaleducation/#gerequirementstext)		3
General Education (Life Science) (catalog.dixie.edu/programs/generaleducation/#gerequirementstext)		3
Hours		15

2nd Year

Fall Semester

ECE 2700 & ECE 2705	Digital Circuits and Digital Circuits Lab	4
ECE 1200	MATLAB and Arduino	1
CS 2420	Introduction to Algorithms and Data Structures	3
MATH 1210	Calculus I (MA)	4
Hours		12

Spring Semester

CS 2450	Software Engineering	3
PHYS 2210 & PHYS 2215	Physics/Scientists Engineers I (PS) and Physics/Scientists Engineers I Lab (LAB)	5
MATH 1220	Calculus II (MA)	4
Hours		12

3rd Year

Fall Semester

MECH 2210 & MECH 2215	Circuits and Circuits Lab	4
CS 3005	Programming in C++	3
PHYS 2220 & PHYS 2225	Physics/Scientists Engineers II and Physics/Scientists Engineers II Lab	5
CS 3310	Discrete Mathematics	3
Hours		15

Spring Semester

MECH 2250 & MECH 2255	Sensors & Actuators and Sensors & Actuators Lab	4
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ECE 2280 & ECE 2285	Microelectronics and Microelectronics Lab	4
MATH 2250	Differential Equations and Linear Algebra	4
General Education (Fine Arts) (catalog.dixie.edu/programs/generaleducation/#gerequirementstext)		3
Hours		15
4th Year		
Fall Semester		
ECE 3730 & ECE 3735	Embedded Systems I and Embedded Systems I Lab	4
MECH 3200 & MECH 3205	Systems & Controls and Systems & Controls Lab	3.5
CS 2810	Computer Organization and Architecture	3
MATH 3400	Probability & Statistics	3
Hours		13.5
Spring Semester		
ECE 4730 & ECE 4735	Embedded Systems II and Embedded Systems II Lab	4
ECE 3500	Signals and Systems	3
CS 3410	Distributed Systems	3
Tech Elective 1		3
Hours		13
5th Year		
Fall Semester		
ECE 4005	CE Product Design I	3
CS 3400	Operating Systems	3
ENGL 3010	Professional Writing and Business Ethics	3
Tech Elective 2		3
General Education (Social & Behavioral Science) (catalog.dixie.edu/programs/generaleducation/#gerequirementstext)		3
Hours		15
Spring Semester		
ECE 4015	CE Product Design II	3
ECE 4500	Digital Signal Processing	3
Tech Elective 3		3
General Education (Lit / Humanities) (catalog.dixie.edu/programs/generaleducation/#gerequirementstext)		3
Hours		12
Total Hours		135.5

Computer Engineering BS Program Learning Outcomes

At the successful completion of the Bachelor of Science degree in Computer Engineering, students will be able to:

1. Formulate and evaluate complex engineering problems with regards to electronics by applying principles of engineering, science, & mathematics.
2. Create satisfactory solutions to a defined problem by using a structured engineering design process.
3. Develop experiments for electronic systems, analyze resulting experimental data, and use engineering judgement to make conclusions from the data.
4. Collaborate effectively with others to establish goals, meet deadlines, and articulate results.
5. Design, prototype, and troubleshoot mechatronic systems that accomplish a specified task or objective and integrate hardware & software.